

## SCIENCE IN PITTSBURGH 1813-1848

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WHEN the subject of this paper was being considered, I felt that to secure enough information on which to base any interpretation might prove exceedingly difficult and the project might have to be abandoned. This has not proved to be the case, although the available records in the conventional source are too scanty really for more than a generalized judgment. As information developed on such institutions as the Pittsburgh Philosophical and Philological Society, for example, I could not help feeling that there must be more information available somewhere on such a well-regarded and important society. Librarians at The Historical Society of Western Pennsylvania, the Pennsylvania Division of Carnegie Library, the Science and Technical Department of Carnegie Library, and the Hillman Library were most eager to assist, but they could find nothing beyond what I have presented in this paper. I have the feeling that somewhere, the minutes of the Philosophical and Philological Society have survived, at least in part. If only the right question could be put to the right person, a matter of pure luck! The same situation exists concerning many of the men who were prominent in scientific circles. At this date they remain only names, not even cataloged in the early city directories. Surely they have descendants who have some remembrances of these ancestors. Again, the right question to the right individuals. I hope that in the future some person or group with the necessary time will undertake the tremendous, tedious, but worth-while task of ferreting out the information needed to really assess the impact of science on mid-nineteenth century Pittsburgh.

The Pittsburgh of 1820 had been newly chartered as a city just four years before.<sup>1</sup> Observers of Pittsburgh of this time give us a picture of a small community of 7,248<sup>2</sup> young, restless, energetic souls

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1 Neville B. Craig, *The History of Pittsburgh* (Pittsburgh, 1917, 2 ed.), 277.

2 Sarah H. Killikelly, *The History of Pittsburgh* (Pittsburgh, 1906), xi.

— a practical people imbued with bettering their material condition. Already Pittsburgh was assuming its character as a manufacturing center and was becoming well known throughout the country for the products of its factories. Pittsburghers were proud of this reputation. Descriptions and histories of city life in the middle period of the nineteenth century abound with business statistics showing gains in manufacturing and the ever-increasing volume of trade.

The attitudes and values of these Pittsburghers of the Jacksonian period were inherited from their fathers and grandfathers, the first pioneers to the Forks of the Ohio. These earlier mechanics and farmers who made the perilous journey over the mountains came not only from the eastern seaboard of the United States but also from England, Germany, and France.<sup>3</sup> They shared two things in common; they were mostly young and all were poor. These ancestors of the Jacksonian Pittsburghers came to this first frontier of the new nation seeking a "Better Life" for themselves and their families. They were following an American tradition, already becoming ancient, of emigrating west for more freedom, opportunity, and prosperity. Thus the social outlook of the children and grandchildren of these pioneers was geared to practical activities concerned with gaining material wealth and the progress to financial security. It would seem to the casual observer of the Pittsburgh scene in the Jacksonian times that there was little place for cultural and aesthetic activities for their own sake. Yet, from the beginning, in this city of workers there were a few who dreamed of the things of the mind, at least part of the time.

After a small community had been well established, there came pioneers of a different sort from Europe and the eastern centers of settlement. At first, probably few of the pioneers of culture were fully conscious of their function in this respect. Certainly the lawyers, physicians, ministers, and school teachers who went were motivated by the same desire to better themselves as truly were the farmers and the mechanics.<sup>4</sup> Strictly speaking, of course, Pittsburgh developed no culture of its own. By 1820, the western frontier settlement of Pittsburgh had deserted its original cultural roots with the West and gave its allegiance to the East. It grew from a few traders' shacks about an isolated military outpost to a city of industrial importance, connected by a cheap and comparatively rapid means of communication with an

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3 Leland D. Baldwin, *Pittsburgh, The Story of a City* (Pittsburgh, 1938), 162-63.

4 Solon J. and Elizabeth Hawthorn Buck, *The Planting of Civilization in Western Pennsylvania* (Pittsburgh, 1969), 372.

eastern center of culture, Philadelphia. Since intellectual interests depend somewhat upon material development, it follows that such development in Pittsburgh must have begun after the city had attained some measure of prosperity, and this is what had occurred.

A study of intellectual interests, such as science in Pittsburgh, is necessarily superficial, because it takes in only the few and leaves out the many, and because, while it can discover that certain persons were interested in science and certain scientific institutions were established, it is exceedingly difficult to assess their influence. However, that is what will be attempted in this paper.

It was the lawyers, doctors, ministers, and educators of Pittsburgh who responded to the growing American interest in science in the period after the War of 1812. This was the period when American science really got its start, emerging finally into a true profession by mid-century. But while American science was growing into a professional body, principally on the eastern seaboard, only little progress was being made in Pittsburgh in the same period. Pittsburgh had to wait until after 1860 for it to at last attain the necessary maturity to support scientific activity. But Pittsburgh, even from its pioneer days, had some contact with early scientists. In 1784, Dr. Moses Marshall, then twenty-seven years old, made a botanical trip to Pittsburgh, his party traveling by wagon. He returned again to Pittsburgh in 1790 as he states in a letter to Sir Joseph Banks: "In May last (1790) I set out upon a botanic tour by way of Juniata to Pittsburgh, thence southward up the Monongahela. . . ." <sup>5</sup> A more memorable visit was made to Pittsburgh by André Michaux, the famous French botanist, on his way to Kentucky in July 1793. M. Michaux came armed with letters of introduction to Judge Hugh Henry Brackenridge, Major Isaac Craig, and other prominent men of Pittsburgh. He spent about two weeks in the little community and made extensive notes on the plants of the area. These are given in M. Michaux's manuscript diary presented to the American Philosophical Society by his son. In 1808, John J. Audubon and his bride of a few days passed through Pittsburgh on their first journey to Louisville, Kentucky. <sup>6</sup> It is very difficult to assess the impact of the rather casual visits of these early naturalists on the still pioneer settlement of Pittsburgh because the only one of the three who has left any record of his visit is André Michaux. His diary says nothing of what he thought of Pittsburgh but rather

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<sup>5</sup> Howard A. Kelly, *Some American Medical Botanists* (Troy, N. Y., 1914), 79.

<sup>6</sup> Lucy Audubon, ed., *The Life of John James Audubon* (New York, 1869), 29.

is a professional record of some length of the flora he found on the banks of the rivers and a report of his visit to a coal mine.<sup>7</sup> To John Audubon, his passing through Pittsburgh was memorable only because of a near-fatal accident to his new bride. As to the interest of the inhabitants in these visits, we have no record at all.

But there was a visit to Pittsburgh by men of science of which we have an excellent and rather charming report of the reaction of the citizens of Pittsburgh. This was the assembling and departure of the Long Expedition on an exploring mission to the Rocky Mountains in May 1819. Edwin James, botanist for the expedition and a writer of the report, describes the departure:

Early in April, 1819, the several persons constituting the exploring party had assembled at Pittsburgh. It had been our intention to commence the descent of the Ohio before the middle of that month; but some unavoidable delays in the completion of the steamboat, and in the preparations necessary for a long voyage, prevented our departure until the first of May . . . . On the 3rd of May we left the arsenal, where the boat had been built, and after exchanging a salute of twenty-two guns, began to descend the Allegheny towards Pittsburgh. Great numbers of spectators lined the banks of the river, and their acclamations were occasionally noticed by the discharge of ordinance on board the boat. The important duties assigned the expedition rendered its departure a subject of interest . . .<sup>8</sup>

So it was that early Pittsburgh's scientific life was enriched, if rather casually, by the scientific visitors from the east. There were perhaps others but there is no record of their comings.

We have seen that as Pittsburgh grew into a young city in the early nineteenth century she dropped her pioneer ways and looked to the east for cultural guidance. So it was to the new interest in science stirring in the eastern cultural centers that Pittsburgh reacted in its own way. This reaction can best be understood, if at all, through an examination of the first scientific institution established in Pittsburgh and what happened to it. Because it was the first with any scientific connection, we must start with the Mechanical Society which was organized in March 1788 by "a few of the mechanics in Pittsburgh to have a meeting on Monday the 24 inst . . . to settle on a plan for a well regulated society," according to the *Pittsburgh Gazette* of March 2, 1788. The Mechanical Society operated a circulating library, owned a cabinet of curiosities, and most interesting, its members organized an impressive chemical laboratory indicating in a small way the ordinary

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<sup>7</sup> *Proceedings of the American Philosophical Society* (Philadelphia, 1889), 92.

<sup>8</sup> Edwin James, ed., *Expedition from Pittsburgh to the Rocky Mountains* (Philadelphia, 1823), 3, 4.

workingman's interest in at least this branch of science.

The first real scientific society was the Chemical and Physiological Society organized in 1813 "by men of scientific interests associated for mutual improvement in the different departments of natural history."<sup>9</sup> These dabblers in science met every two weeks. They acquired a library and chemical apparatus which they lodged in a room of the courthouse. The first president was Dr. B. Troost of whom little is known beyond his interest in chemistry. Ten years later he is listed as a lecturer in chemistry for the Pittsburgh Philosophical and Philological Society. However, it is known that in January 1815 Dr. Troost joined with Samuel Pettigrew, treasurer of the Chemical Society, and J. B. Trevor, the first secretary, to form a business firm to operate the Western Eagle Lead Factory. Evidently the society did not prosper for in November 1814 new officers were elected, the most important of whom were the president, Walter Forward, and the new secretary, Harmar Denny. These two were among the most prominent politicians of Pittsburgh at the time, and they must have lent their names to the society to bolster its fortunes. That this infant scientific society was in trouble is attested by the fact that it is almost certain that it was disbanded at a special meeting held December 14, 1814.<sup>10</sup> No more notices of meetings appeared in the newspapers. It is to be regretted that the Pittsburgh Chemical and Physiological Society did not have a longer life, for it was undoubtedly the third such society founded in the state. It was preceded by only two Philadelphia societies, the Chemical Society of Philadelphia, founded by James Woodhouse in 1792, and the Columbian Society of Philadelphia, founded in 1811.<sup>11</sup> Probably the society failed because its officers were concerned with their business affairs which must have seemed of greater importance. As we have seen, Troost, Pettigrew, and Trevor had set up a new business. The librarian, Aquila M. Bolton, besides being the proprietor of Academy Hall, was a land broker.<sup>12</sup>

Denny and Forward were connected with virtually every civic activity of the day. Dr. Frederick Aigster, who is listed as the lecturer for mineralogy for the society, was one of the founders of a company to manufacture sulphuric acid. He was formerly a lecturer in chemistry at Dickinson College. Magnus Murray, lecturer on botany, was a lawyer and from 1828 to 1831 was mayor of Pittsburgh. Dr. Joel

<sup>9</sup> Zadok Cramer, *The Navigator*, 1814, 67.

<sup>10</sup> *Pittsburgh Gazette*, Dec. 9, 1814.

<sup>11</sup> Edgar Fahs Smith, *Chemistry in America* (New York, 1914), 27.

<sup>12</sup> James M. Riddle, comp., *The Pittsburgh Directory for 1815*, 12.

Lewis was the lecturer in anatomy and in 1822 became president of the Pittsburgh Medical Society. It can be seen from the above recitation that the men prominent in the Pittsburgh Chemical and Physiological Society evidently considered the pursuit of science as an avocation which they had to relinquish, probably with regret, when their everyday affairs became too pressing. It was a characteristic of all early scientists that they had another pressing vocation and the following of science as a full-time profession had to wait until the end of the formative period at mid-century.

The only institution whose members did devote some of their time in the pursuit of science was the faculty of the Western University of Pennsylvania. The university as such had been chartered in 1819. The first principal, Dr. Robert Bruce, was also the instructor in natural philosophy and chemistry.<sup>13</sup> However, as was usual in those days, Dr. Bruce was also pastor of the First Associate (United) Presbyterian Church of Pittsburgh for twenty-eight years. It would be almost impossible to exaggerate the influence Dr. Bruce had over the young community of Pittsburgh. Ministers, lawyers, businessmen, teachers, and many ordinary citizens have pronounced Robert Bruce the most learned and the most humane man they had ever met. It was his renown, interest, and dedication that set the tone for the Western University approach to education. Because of his influence which dominated the university, learned men of science were attracted to the faculty.

Such a man was Peter Laurig who was engaged in 1829 to deliver lectures in chemistry to the senior class. Dr. Laurig gave these lectures in the evening so that the young men of the city could benefit from them for a fee of \$5.00 for the course. Another was Dr. Tobias Harper Mitchell, past professor of chemistry and mineralogy at Kenyon College, Ohio, who came to the university to teach the same subjects in 1835. The influence of the Western University upon shaping the scientific attitudes of the people of Pittsburgh was not limited to the public lectures given by such men as Peter Laurig and Harper Mitchell, but it also showed itself in the role of the university in the organization of the city's most prestigious scientific society for the purpose of study and research.

The Pittsburgh Philosophical and Philological Society was organized in December 1827, with no official connection with the uni-

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<sup>13</sup> Agnes L. Starrett, *Through 150 Years, The University of Pittsburgh* (Pittsburgh, 1937), 97.

versity, but university professors were officers and lecturers. Dr. Robert Bruce was chosen the first president; Robert Black of the university was vice-president. Dr. Joseph Gazzam, graduate of the university about 1814, was corresponding secretary and lecturer in anatomy and physics. The Reverend John Taylor was the lecturer in astronomy. As before, these busy men had other primary vocations. Dr. Gazzam had a long and distinguished career in Pittsburgh as a physician for forty-six years. He was one of the founders of the Pittsburgh Medical Society in 1821.<sup>14</sup> Mr. Taylor was the first rector of Trinity Episcopal Church and also Pittsburgh's first astronomer and teacher of astronomy.<sup>15</sup> He also drew the calculations for the phases of the moon and the weather predictions for Zadok Cramer's *Pittsburgh Magazine Almanac* for many years. Even as far back as 1808, Mr. Taylor gave evening lectures on astronomy while a member of the faculty of the Pittsburgh Academy, the predecessor to the Western University of Pennsylvania.

Again the pattern emerges; well-known Pittsburgh men whose principal occupations were other than science, but who attempted to give as much of their busy lives to science as they could spare.

Although organized in 1827, the Philosophical and Philological Society did not hold its first regular meeting until February 1828.<sup>16</sup> For many years the society was the leading organization in Western Pennsylvania. All the prominent citizens, ministers, professors at the university, lawyers, physicians, and students took part in its proceedings, and many of them gave much time and effort to keep it flourishing. Weekly debates were held by the society at which the most celebrated speakers of Pittsburgh took part. As time went on the Philosophical and Philological Society did not limit itself to scientific matters but ranged over all the arts as well. For example, during the winter of 1828-1829, lectures were given on mechanics, architecture, civil engineering, and geography. But it did not lose sight of its main purpose, the dissemination of scientific knowledge. The surviving records of the society indicate that it lasted until 1840 when it seems to have died out but was revived in 1846, at which time it was referred to as a time-honored institution. After this date, the Philosophical and Philological Society perished for good.

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14 Theodore Diller, *Pioneer Medicine in Western Pennsylvania* (New York, 1923), 109.

15 Marcellin C. Adams, "John Taylor, Pittsburgh's Early Astronomer," *Western Pennsylvania Historical Magazine (WPHM)*, 23 (1940): 133.

16 Starrett, 89.

The published annual address of the Philosophical and Philological Society for 1828, given by Dr. Bruce, has survived.<sup>17</sup> This address gives an excellent insight into the attitudes of that era towards science. In the first part of the speech, Dr. Bruce catalogs the many past accomplishments of science up to his time. He then goes on in praise of philosophical (scientific) societies,

Our own country has not a city of any eminence without library and philosophical societies; lending a hand to aid in the great improvements of the world . . . .

These institutions, thus aided by all the scientific men in the world, have made us almost perfectly acquainted with every continent, peninsula, island, ocean, sea, river and lake on the face of the earth. They have separated the fabulous from the true history of the nations in the early period of our world, and they have cultivated to an amazing degree a knowledge of every minute object which land or water, air or stary firmament, in ancient or modern times, have displayed . . . .

Towards the end of his address, Dr. Bruce reveals to us the attitudes of the educated Pittsburghers of his day. He says,

The situation, relations, and prospects of Pittsburgh, Gentlemen, have claims upon its citizens equal to most cities in the world. Its prospects are excelled by few . . . the Ohio which connects Pittsburgh with all these fertile western regions, say that our city has prospects solid as are her inexhaustible mines for the support of her manufacturers, and permanent as are the streams which flow by her. But is Pittsburgh to become one of the first cities in commerce and manufacture in the world, and her population to remain ignorant of that science which is no less ennobling to the human mind, than it is the solid basis of the prosperity of any place, in the present highly improved state of society and of the arts? No, Gentlemen, we must recollect, that it is by unwearied industry and perseverance that we can, in any degree, become acquainted with the various branches of the sciences and the arts as they now exist, . . . it is not more as insulated individuals . . . nor as general philosophers . . . that we are to exert ourselves, than it is as inhabitants of Pittsburgh — a place to which great wealth must flow, and where almost every art, which requires science to provide its materials, and to preside over their operation, will flourish.<sup>18</sup>

One other society organized outside the university for the purpose of scientific study was the Pittsburgh Mechanics Institute which also drew on the Western University for some of its officers and lecturers.<sup>19</sup> The Mechanics Institute was organized in 1830 with Dr. Bruce as president and Thomas Bakewell as secretary. Bakewell was

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17 The title page of the published report of Dr. Bruce's address states: "Address Delivered Before the Pittsburgh Philosophical Society." It appears that the "Philological" part of the title of the society was omitted in order that the title could be placed on one line. There is no evidence that the Pittsburgh Philosophical Society mentioned later in this paper had any connection with the Pittsburgh Philosophical and Philological Society. There is evidence from several sources that Dr. Bruce was president of the Philosophical and Philological Society in 1828.

18 "Bruce Address," 15-16.

19 Starrett, 89.



a leading businessman of the city. He was the chief inspector for Bakewell and Co. who dealt in pearl and potash.<sup>20</sup> This society also had lectures during the winter months on educational and scientific subjects. The object of the society was to promote the useful arts and sciences.

To complete the record, mention should be made of two other societies which seem to have held some interest in scientific subjects. The existence of these two societies is affirmed by the announcements of their meetings. There is the announcement of a meeting of the Franklin Society at Bolton's Academy in the *Pittsburgh Gazette* for October 29, 1813. The name of this society and the place of meeting suggest that it was either of literary or scientific interest. The Pittsburgh Philosophical Society was organized sometime before 1817 as an announcement of its meeting appears in the *Pittsburgh Gazette* for June 27, 1817. According to Harris's *Pittsburgh Directory for 1837*, it possessed a library and apparatus for making chemical experiments. Men with scientific learning delivered lectures before the members. There seems to be no further information available of either society.

The scientific men of Pittsburgh that we have met so far have all considered science as an avocation. Late in the period of our interest there was a Pittsburgher who was a scientist by profession. At least we can call Thomas Jackson Rodman a Pittsburgher, for it was in Pittsburgh that he accomplished the greater part of his life's work. We can also say that he was a professional scientist even though he wore the uniform of a lieutenant in the United States Army at the time; for his entire professional career was spent in experimentation and research. Rodman's first assignment after graduation from West Point in 1841 was as assistant ordnance officer at the Allegheny Arsenal in Pittsburgh from 1841 to 1848.<sup>21</sup> During this period Rodman applied himself to the problem of improvement in cannon manufacture by his experiments in metals. It was while working on these problems that Rodman made his great contributions in metallurgy to modern science. While a member of a group of young officers on detached service devising cannon testing machinery, Rodman came to the conclusion that cannon barrels cast hollow and cooled from the inside would be many times stronger than the conventional method of casting them solid, cooling them from the outside, and boring out the barrel. However,

<sup>20</sup> Isaac Harris, pub., *Pittsburgh Business Directory for 1837*, 34.

<sup>21</sup> Edward G. Williams, "Pittsburgh, Birthplace of a Science," *WPHM*, 45 (1962): 263-64.

before he could prove this theory, Rodman was to conduct hundreds of tests with many failures over a period of fourteen years before proving his theory to be correct.<sup>22</sup> These experiments, for a large part, were carried on at the Allegheny Arsenal. Rodman's mammoth castings in themselves are interesting, but his real and lasting significance in history lies in his having taken metallurgy out of the realm of a trade and leaving in its place the systematized science of metallurgy.

The tremendous interest in science which stirred in America after the end of the War of 1812 was not lacking in Pittsburgh. But Pittsburgh responded very differently than the eastern seaboard communities to which the city looked for cultural and intellectual leadership. Because Pittsburgh was a younger and smaller community than her eastern neighbors, and deeply engaged in the struggle to establish herself, she had not the human resources to devote to the full-time pursuit of science. Nor were there adequate financial resources available to support such activities as there began to be in the latter half of the middle period of the nineteenth century. So, it fell to the talented amateurs, the ministers, lawyers, professors, doctors, and even businessmen, to be the leaders of science. These were the men with enough education to be able to react positively to the scientific information that was beginning to flood in from the eastern cultural centers. However, the stirrings of science were not entirely lost on the common folk who received their knowledge of science on a less sophisticated scale from such popular almanacs of the day as Cramer's *Pittsburgh Magazine Almanac*.

But it was the educated leaders who founded the few scientific societies (not so few if the small size of the city's population is considered: 7,200 in 1820; 12,500 in 1830; 21,500 in 1840) that provided for the instruction of the ordinary people who hungered for more scientific knowledge than was available in the popular almanacs. That the societies failed and the instruction had to be curtailed was not due to lack of interest, but rather to lack of time. After all, the men who were the leaders in science were the same men who were most active in the professions and businesses and who were involved in all the civic endeavors of the young city. Many of these men were influential in establishing the Western University of Pennsylvania. It was largely through this institution that the necessary continuity was provided to bridge the gap between the time when science was so haphazardly

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<sup>22</sup> Captain Thomas J. Rodman, *Reports of Experiments on the Properties of Metals for Cannon* (Boston, 1861).

served until after 1860 when science, through the more normal means of professional scientists, professional societies, and professional journals, became firmly established in Pittsburgh. It was the Western University of Pennsylvania, afterwards the University of Pittsburgh, that furnished the training base.

Just one last interesting aside. A search of the roster of members of the American Association for the Advancement of Science given in the published report of its second annual meeting, 1849, reveals the name of only one member for Western Pennsylvania, none from Pittsburgh. This was Dr. Alfred T. King of Greensburg. Dr. King was born October 22, 1813. He studied medicine in Philadelphia and came to Greensburg about 1838 to set up practice in partnership with another physician. In 1840, Dr. King wrote a series of nine articles for a local newspaper on geology. In 1844, he published a paper describing the finding of fossil remains and footprints of extinct animals in coal deposits near Greensburg. His discovery was among the first in the world of geologists proving that higher orders of air-breathing animals existed in the carboniferous period.<sup>23</sup> Of all the persons mentioned in this paper, only one doctor from a small, neighboring village considered himself and was considered professional enough to belong to America's foremost scientific association.

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<sup>23</sup> George D. Albert, *History of Westmoreland County* (Philadelphia, 1882), 353-57.

After having served with distinction as editor of the *Western Pennsylvania Historical Magazine* for sixteen years, Miss Prudence B. Trimble resigned that position in September 1971, after the October issue of the magazine was well under way. The trustees and staff of The Society held a dinner at the Twentieth Century Club preceding the meeting of October 6, 1971. Although the director has assumed editorial responsibility for the magazine, Mrs. W. Howard Pollard, as associate editor, is largely responsible for form and content.